

- (57) A shaving unit comprises a substantially rigid frame 10 to which at least one razor blade 11, 12 is secured, the blade having a non-planar cross-section which is uniform throughout the length of the blade. Such a cross-section serves to impart rigidity to the blade and so avoids the necessity to tension the blade or to support it throughout its length.



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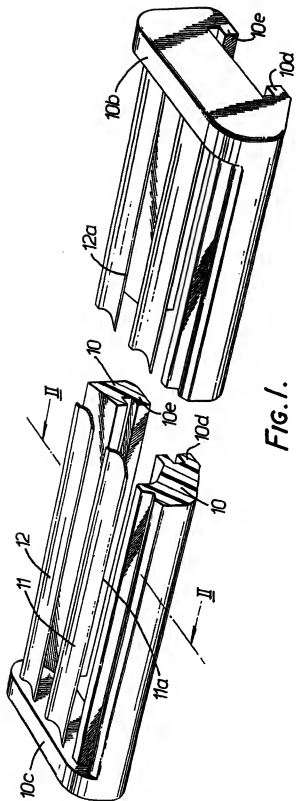


FIG. 1.

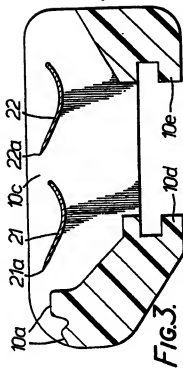


FIG. 3.

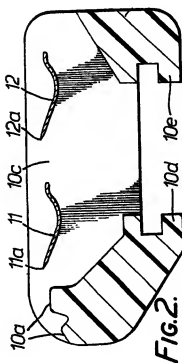


FIG. 2.

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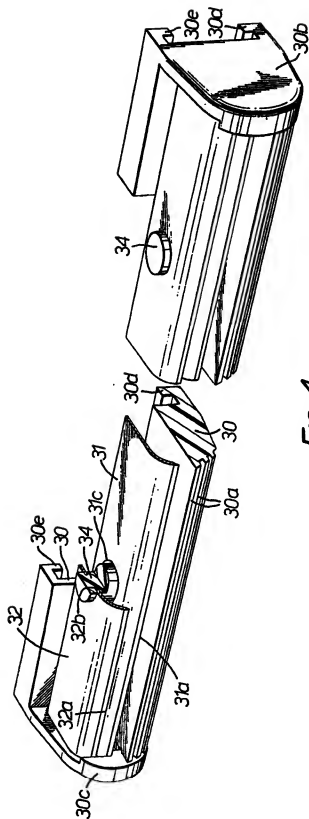


FIG. 4.

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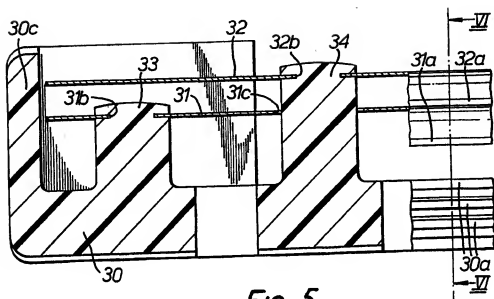


FIG. 5.

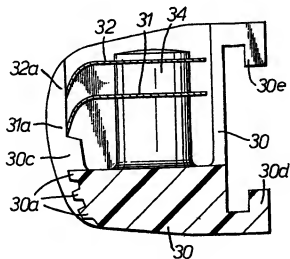


FIG. 6.

## SPECIFICATION

## Shaving units

- 5 This invention relates to shaving units. By the term 'shaving unit' is meant a generally rigid member, usually of plastics material, to which is secured one or more razor blades each having one or more cutting edges, a guard surface being provided for the cutting edge or cutting edges of the, or each, blade.

- 10 According to the present invention there is provided a shaving unit comprising a substantially rigid frame to which at least one razor blade is secured, the blade having a non-planar cross-section which is uniform throughout the length of the blade.

- 15 The novel features of the present invention will be better understood from the following description of two constructions of shaving unit in accordance with the invention, which will be described by way of example only, with reference to the accompanying drawings in which:

- 20 *Figure 1* is a perspective view of the first construction of shaving unit, broken in a mid-portion to show details,

- Figure 2* is a sectional view along the line II-II in Fig. 1.

- 30 *Figure 3* is a similar view to Fig. 2 but showing a different cross-sectional shape for the blades,

- Figure 4* is a perspective view of a second construction of shaving unit, broken in a mid-portion to show details,

- 35 *Figure 5* is a plan view of one end of the shaving unit shown in Fig. 4, partly broken away to show details, and

- Figure 6* is a sectional view along the line VI-VI in Fig. 5.

- Referring now to Figs. 1 and 2, it will be seen that in this construction the shaving unit comprises a plastics frame 10, the upper edge of the front of which provides a guard surface 10a which contacts the skin during shaving. The frame 10 has end members 10b, 10c which support two non-planar blades 11, 12 each having a cutting edge 11a, 12a on the side of the blade which is nearer to the guard surface 10a. The blades 11, 12 have a uniform cross-section throughout their length, the cross-section being straight for some distance back from the cutting edge 11a, 12a, being curved in a mid-portion, and with the end remote from the cutting edge being of reverse curvature from the curvature of the mid-portion (see particularly Fig. 2). The underside of the frame 10 is provided with inwardly turned flanges 10d, 10e which provide a trackway for engagement with a handle (not shown) of known form, having a track which engages in the trackway. The rear of the leading blade 11 serves as the guard surface for the cutting edge 12a of the trailing blade 12.

- 65 The blades 11, 12 may be secured to the

end members 10b, 10c by any suitable method; for example, the ends of the blades 11, 12 may be inserted in recesses (not shown) in the end members 10b, 10c and secured therein by ultrasonic forming of the plastics. Alternatively or additionally, adhesive may be used to secure the blades.

- 70 The blades may be manufactured from blade strip of planar form which is given the desired cross-sectional curvature by appropriate means, for example by the use of a press tool.

- The purpose of having the blades of curved, non-planar, cross-section is to impart rigidity to the blades and so avoid the alternatives of tensioning the blades, or supporting them throughout their length. In this particular construction this enables the use of blades which are of less overall width (that is the distance 85 between the cutting edge and the rear edge of the blade) than would be possible with a planar blade of the same thickness. By reducing the overall width of the blades, the width of the shaving unit from back to front can be reduced, and this is an advantage when shaving in less accessible parts of the face, such as under the nose. Furthermore, because the blade is not sandwiched between a base and top cap the clearance of shaving debris from the cutting edges is facilitated, and the shaving unit is given an attractive "see through" appearance.

- For a given width of blade the rigidity can be increased by using a smaller radius of curvature, the minimum radius which can be used without cracking being dependent upon the composition of the blade, its treatment during formation, and its thickness. With conventional 0.1 mm blade strip, a radius of curvature lying between 0.5 and 2.0 mm is preferred, with the range of 0.8 to 1.5 mm being particularly suitable. With thinner or thicker blade strip, an appropriately lesser or greater minimum radius could be used.

- 110 Fig. 3 shows one possible alternative cross-sectional shape for the blades, here identified as 21, 22 having respective cutting edges 21a, 22a, the remainder of the shaving unit being as shown in Figs. 1 and 2. To ensure that the rear edge of a blade 21, 22 does not scrape the skin of the shaver it is desirable for it to be rounded or capped, for example with plastic. This is not necessary with the reverse curvature of the rear of the blades 11, 12.

- 120 As an alternative to a plastics frame, a metal frame could be used, for example a stainless steel pressing, to which the blades could be secured by welding.

- Of course, the form of handle used with the shaving unit can take many forms, and the shaving unit may be integral with the handle to form a disposable unit, rather than being a replaceable item for use with a permanent handle.

- 130 Whilst in the first construction the major

concave surface of the blades is uppermost, in the second construction the blades are positioned so that the concave surface is facing forwardly with the unsharpened edge lying

- 5 adjacent the underside of the shaving unit. This construction is shown in Figs. 4 to 6. As with the first construction the shaving unit comprises a plastics frame 30 the upper edge of the front of which provides a guard surface  
10 30a which contacts the skin during shaving. The frame has end members 30b, 30c which shield the ends of two non-planar blades 31, 32 but do not support them. For the major portion of their cross-section (which is uniform  
15 throughout their length) the blades 31, 32 are flat, the blades being curved in the region behind the cutting edge 31a, 32a and with the concave surface facing forwardly. The underside of the frame 30 is provided at the front with an inwardly turned flange 30d and  
20 at the rear with two shorter inwardly turned flanges 30e, which together provide a trackway for engagement with a handle, as described in connection with the first construction.  
25

- The blades are secured to the frame 30 by posts 33, 34 which extend rearwardly from the leading edge of the frame 30, the two posts 33, 33 (one of which can be seen in  
30 Fig. 5) are respectively adjacent the end members 30b, 30c and are shorter than the other two posts 34, 34. The shorter posts 33, 33 serve to support the leading blade 31 which has two apertures 31b, 31b, one near each  
35 end, through which a respective one of the posts 33 can pass, the head of each post being rivetted over to secure the blade 31. The leading blade 31 also has two apertures 31c, 31c through which a respective one of  
40 the inner posts 34, 34 can pass without engaging the blade 31, a respective one of the posts 34, 34 then fitting in apertures 32b, 32b in the trailing blade 32 with the head of the posts 34, 34 being rivetted over  
45 to secure the blade 32. This construction makes possible a shaving unit whose width from back to front is substantially less than that of conventional shaving units.

- In another possible construction (not illustrated) blades of non-planar cross-section are positioned with their cutting edges opposing one another and in close proximity, so that when the unit is moved in one direction one blade cuts whilst the other acts as the guard surface, and vice versa. In this case the  
50 blades may be appropriately secured relative to one another at, or by, their ends only, thereby dispensing with a frame.

- In yet another construction (not illustrated) in which the frame could be dispensed with,  
60 the leading blade has a convex surface uppermost and the trailing blade a concave surface uppermost. The convex surface of the leading blade will act as a guard surface for the trailing blade. When turned over, the role of  
65

the two blades would be interchanged.

## CLAIMS

1. A shaving unit comprising a substantially rigid frame to which at least one razor blade is secured, wherein the blade has a non-planar cross-section which is uniform throughout the length of the blade.
2. A shaving unit comprising a substantially rigid frame to which at least one razor blade is secured, wherein the blade has a non-planar cross-section which is uniform throughout the length of the blade, the blade being secured to the frame at not more than  
75 two positions along the length of the blade.
3. A shaving unit comprising a substantially rigid frame to which at least one razor blade is secured, wherein the blade has a cross-section which is uniform throughout the  
85 length of the blade, a portion of the cross-section being curved with a radius of curvature which lies between 0.5 and 2.0 mm.
4. A shaving unit comprising a substantially rigid frame to which at least two razor  
90 blades are secured, each blade having a cross-section which for the major part is straight and is curved at one end at which a cutting edge is formed, the cross-section being uniform throughout the length of the blades, the  
95 two blades being positioned one behind the other (in the direction in which the shaving unit is moved in use) and with the straight portions of the blades lying in parallel planes which are approximately perpendicular to said  
100 direction.
5. A shaving unit according to claim 1, claim 3 or claim 4, wherein the blade is secured to the frame at not more than two positions along the length of the blade.
6. A shaving unit according to claim 1, claim 2, claim 3 or claim 4, wherein posts are provided on the frame to which intermediate portions along the length of the blade are secured.
7. A shaving unit according to claim 2, claim 3 or claim 4, having two blades, and wherein four posts are provided, one blade having intermediate portions along the length of one blade secured to two posts and intermediate portions along the length of the other  
110 blade being secured to the other two posts.
8. A shaving unit according to claim 1, claim 2, claim 3 or claim 4, wherein the blade is secured to the frame at each end of the  
120 blade.
9. A shaving unit according to claim 1, claim 2 or claim 3, wherein the blade has a cross-section which for the major part is straight and is curved at the end at which the  
125 cutting edge is formed.
10. A shaving unit according to claim 1, claim 2 or claim 3, wherein the blade has a cross-section which is straight in the region of the cutting edge and is curved at a mid-  
130 portion of the cross-section.

11. A shaving unit according to claim 1,  
claim 2 or claim 3, wherein the blade has a  
cross-section which is curved at the end re-  
mote from the cutting edge with a reverse  
5 curvature from the curvature of the mid-  
portion.
12. A shaving unit according to claim 1,  
claim 2 or claim 4, wherein a curved portion  
of the blade has a radius of curvature lying  
10 between 0.5 and 2.0 mm.
13. A shaving unit according to claim 1,  
claim 2, claim 3 or claim 4, wherein a curved  
portion of the blade has a radius of curvature  
lying between 0.8 and 1.5 mm.

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